Nangarhar University
International Journal of Biosciences

Received: 22 Aug 2023
Accepted after revision: 25 Sep 2023
Published Online: 30 Sep 2023

ORIGINAL ARTICLE | Vol 2, Issue 3 (2023) | e-ISSN: 2957-9988

Prevalence of Haemonchosis in Slaughtered Sheep in Daronta, Nangarhar

Rahimullah Amarkhil[1], Faisal Danish[2], Ahmadullah Zahir[3], Mahboobullah Ahmadi[4], Gulnabi Noori[5]

[1]Department of Para-Clinic, Faculty of Veterinary Sciences, Afghanistan National Agricultural Sciences and Technology University, 3801 Kandahar, Afghanistan

[2]Department of Clinic, Faculty of Veterinary Science, Afghanistan National Agricultural Sciences and Technology University (ANASTU), Kandahar, Afghanistan

[3]Department of Food Hygiene and Technology, Faculty of Veterinary Sciences, Afghanistan National Agricultural Sciences and Technology University,3801 Kandahar, Afghanistan

[4]Department of Pre-Clinic, Faculty of Veterinary Sciences, Afghanistan National Agricultural Sciences and Technology University, 3801 Kandahar, Afghanistan

[5]Department of Animal Sciences, Faculty of Agricultural, Mirwais Khan Nika High Education Institute, 4003 Zabul, Afghanistan

[*]Corresponding author email: ah.zahir@anastu.edu.af

ABSTRACT

Background: In developing countries, one of the most prevalent parasitic diseases is Haemonchosis. This infectious disease mostly caused severe clinical symptoms and ultimately death in small and large-scale ruminants.

Materials and Methods: A cross-sectional investigation was carried out to seek the prevalence of *Haemonchus spp*. in slaughtered sheep at Daronta in various restaurant abattoirs in Nangarhar, Afghanistan. A total of 150 abomasum from slaughtered animals were observed from November 2018 to June 2019. The study animals were grouped based on sex (female and male) and their age (< 1 year, 1 – 2 years, and > 2 years).

Findings: The results showed that the overall prevalence of Haemonchosis in sheep was 22.66%. In terms of age, the prevalence rate was higher in a group less than 1 year, (27.27%) followed by 1 to 2 years, (22.44%), and more than 2 years (14%) sheep. The sex-wise prevalence of Haemonchosis was higher in females (30.61%) as compared to males (18.81%). There was no significant difference ($P > 0.05$) between sex and age groups.

Conclusion: The epidemiological evidence of the current study exhibited that Haemonchosis is a noticeably prevalent disease in sheep in Daronta, Nangarhar. To prevent, de-worming and good management practices are recommended.

Keywords: Haemonchosis, Sheep, Prevalence, Abattoir

INTRODUCTION

Agriculture is a crucial sector in Afghanistan, with 15% of it relying on livestock rearing. According to the Ministry of Agriculture, Irrigation, and Livestock, the country has an average of 5.2 million cattle, 13.3 million sheep, 7.4 million goats, 0.17 million camels, 0.17 million horses, 1.4 million asses, and 11.9 million chickens. As most of the country's population lives in rural areas, sheep rearing is an economically viable source of livelihood for

rural communities in Afghanistan (Muradi and Boz, 2018). These animals play important role in terms of producing mutton and good-quality wool. However, they faced a lot of difficulties, especially Haemonchosis. This common parasitic disease is imperative in sheep, which causes a reduction in body weight and frequent death. In terms of the health problems and losses in productivity of sheep, parasites are a main cause that is linked to massive economic losses, primarily in resource-poor areas (Cernanska et al., 2005).

The most important parasite in sheep is *H. contortus* (Hasnain and Usmani, 2006) which causes Haemonchosis. This worm is more existing abomasal pathogenic parasite of sheep, which is known as the "red stomach worm", "wireworm" or "barber's pole worm" of sheep and goats (Howell et al., 2008). A very high invasion rate (85%) of *Haemonchus contortus* is mostly observed in young small animals that inhabit the fourth stomach (Khalil-ur-Rehman et al., 2009). According to the previous study, the *Haemonchus controtus* dispersed across the globe. The author also added that these parasites have survived in conditions from tropical to temperate regions (Waller and Chandrawathani, 2005). In small ruminants, the major impacts of both the larvae (L4) and the adults of *Haemonchus contortus* are related to the blood-sucking activity, which is accountable for huge losses of blood. For instance, each parasite daily sucks 0.05 milliliter of blood, consequently, an animal that has 1000 *Haemonchus contortus* may be lose about 50mL of blood every day (Habte et al., 2018), resulting in a decrease in red blood cells, packed cell volume, body weight, and wool growth (Perry, 2002). A heavy number (2000 – 3000) of *Haemonchus contortus* influx can also kill sheep very soon. Sheep of all ages are exposed to *Haemonchus* infection, but severe conditions were reported in lambs and kids (Habte et al., 2018).

The infected animal with this parasite shows clinical signs such as pale mucous membranes, and lower plasma protein resulting in submaxillary edema (bottle jaw). These clinical signs are more evident in older sheep and goats under stress may also have total anemia (Bowman, 2003), which is described as causing under-developed growth, poor productivity, weight loss, anorexia, anemia, and edema (Mesele and Zegeye, 2013). As a result of this, the main effect of Haemonchosis is economic losses owing to lower production and a high rate of mortality (Qamar et al., 2011). According to the kinds of literature, the diagnosis of this disease was carried out based on clinical signs, season, and grazing history. Moreover, fecal examination is confirmative, but specific identification and enumeration are difficult and require observation of adult parasites during postmortem inspection and specialized laboratories (Acharya et al., 2006). Therefore, the current study was performed to evaluate the prevalence of *Heamonchus contortus* in sheep in Daronta, Nangarhar province, Afghanistan.

MATERIALS AND METHODS

Study Area

A cross-sectional investigation was launched from November 2018 to June 2019 in Daronta restaurants. Daronta is located in the Nangarhar city of Jalalabad province near the border of Laghman province. It is 140 km far from the capital city of Afghanistan (Kabul). It is found at latitude of 34.170, and a longitude of 70.620. The area has an altitude of 575 meters above sea level and has 60.13(16.47%) rainfall days. The mean annual rainfall and mean temperature are 20.05 mm and 31.38 ^{o}C, respectively.

Study Animal

A total of 150 sheep's abomasums were examined to determine the prevalence of *Haemonchus conturtus*. The slaughtered sheep were grouped based on sex; female (n=49) and male (n=101), and age as < 1 year (n=66), 1 – 2 years (n=49), and > 2 years (n=35). The age was determined by dental eruption patterns.

Study Methodology

Pre mortem observation

Ante mortem observation was carried out a few hours before slaughter. The age, sex, and general health condition of the animal were accurately documented.

Post mortem observation

One day per week (Friday) visit was made to the selectively selected restaurants, and the study was carried out based on the previously described method (Bitew et al., 2011).

Sampling Method

In the current study, to determine the prevalence of sheep Haemonchosis, a simple random sampling approach was applied.

Data Analysis

The data was analyzed by Chi-square using SPSS version 23 software, and to determine the significant differences between means, multiple comparison tests were carried out at ($p < 0.05$) using IBM SPSS Statistics.

RESULTS

In the present work, a cross-sectional study was performed to determine the prevalence of *Haemonchus spp*. in slaughtered sheep. The result of this investigation revealed that the overall prevalence of Haemonchosis in sheep was 22.66% (Table 1).

Table 1. Age-wise prevalence of *H. contortus* in sheep

Age	Examined sheep	(+)*	Prevalence (%)	*P. Value*
<1 year	66	18	27.27	.199
1 – 2 year	49	11	22.44	
>2 years	35	5	14	
Total	150	34	22.66	

*+ represent the positive cases

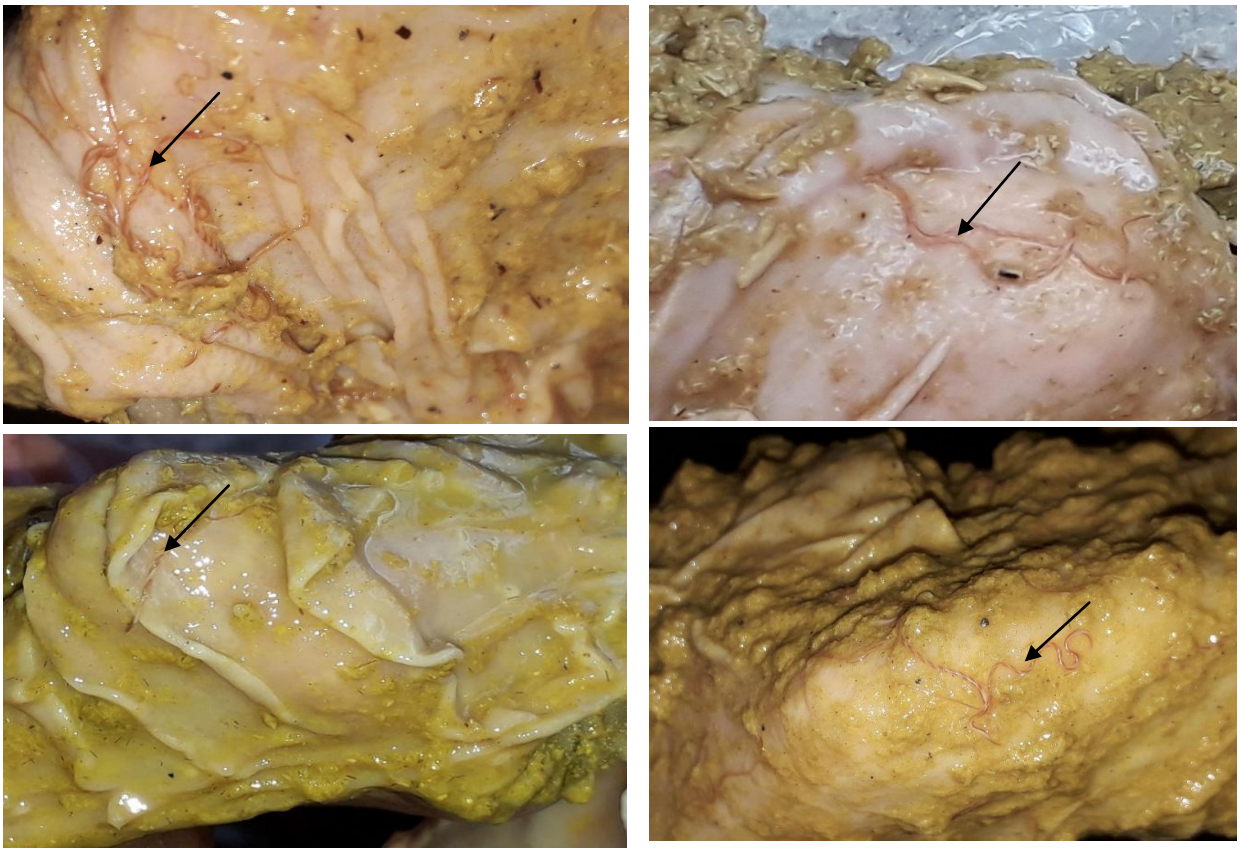
The result disclosed that a higher prevalence rate of Haemonchosis was found in lower than 1-year-old (27.27%) followed by 1 – 2 years (22.44%) and more than 2 years (14%). Our result showed that among the studied age group, the prevalence of *H. contortus* was statistically insignificant ($p > 0.05$) (Table 2). In comparison to males, the prevalence of *H. contortus* was higher in females (30.61%), while the overall prevalence was 22.66% (Table 2). No significant difference ($p > 0.05$) was found between sexes of sheep.

Table 2. The prevalence of *H. contortus* in sheep based on sex

Sex	Examined sheep	(+)*	Prevalence (%)	P. Value
Male	101	19	18.81	.157
Female	49	15	30.61	
Total	150	34	22.66	

* + represent the positive cases

Figure 1 showed the presence of some adult worms of *Haemonchus contortus* on the abomasal surface of selected sheep. Some of these worms were seen moving freely within the abomasal contents, while others were observed to be attached to the mucosal surface.



Figures 1. Arrow showed the presence of some adult worms of *Haemonchus contortus* on the abomasal surface.

DISCUSSION

The current study result revealed the overall prevalence of Haemonchosis infestation in sheep was 22.66%. A similar finding was reported by (Iqbal et al., 1993), that the infection in sheep was 21.7%, and (Mesele and Zegeye, 2013), who observed that the overall prevalence of *H. contortus* was 22.8%. As compared to the study carried out by Mubarak et al. (2013), the prevalence of Haemonchosis in our study was lower (Mubarak, 2013). Consistent results were also stated by (Raza et al., 2009; Abdo et al., 2017) and the data was 37.1% and 69.6% respectively. This

demonstrated that the prevalence of *H. contortus* was higher (9.3%) than data reported by (Tehrani et al., 2012). The current study also exhibited that the prevalence of Haemonchosis regarding various ages was 27.27%, 22.44%, and, 14% in lower than one year, one to two years, and more than two years accordingly (Table 1).

However, there was no significant association (p >0.05) between the age of animals. Sheep lower than one-year-old presented a higher rate (27.27%) of infection. This might be owing to their low resistance or more vulnerability because these small ruminants have not been exposed to the infection. However, during the first year of their life, they fed and browsed on grasslands, consequently, the first stage of their exposure to infection commenced. The further study explained that the low level of parasitism reported in adult animals is due to the development of significant immunity over time, particularly against *Haemonchus spp* (Abdo et al., 2017). This result was similar to (Qamar et al., 2009), who stated that the higher infection rate was related to sheep below 9 months. However, (AL-Hasnawy and Sci, 2014) reported that the prevalence of Haemonchosis was higher in 1 year as compared to 2 years. This result is per (Bala et al., 2015; Eke et al., 2019; Lateef et al., 2005; Magona and Musisi, 2002; Mesele et al., 2014; Mubarak, 2013; Vanimisetti et al., 2004; Vlassoff et al., 2001), but in contrast with (Brik et al., 2019), who documented that the higher infection rate was found in aged animal than young animals.

Based on the sex of the study animals, our result revealed that the rate of infection in males was (18.81%) lower than in females (30.61%) (Table 2). There was an insignificant association (p > 0.05) between the sexes of study animals. A similar finding was reported in goats, in which a higher prevalence of Haemonchosis was found in females compared to males. The authors added this might be due to the lower resistance of female goats which is attributed to their reproductive events and unbalanced diet. Goats are voracious eaters by nature, which gives them more chance of acquiring infective larvae than males (Nahar et al., 2012). According to the previous study, the high rate of infection in females is probably due to the number of females over males in the flock and the period in the grassland (AL-Hasnawy and Sci, 2014). These results are similar to those (AL-Hasnawy and Sci, 2014), who stated that a higher infection rate was found in females (48.64%) as compared to males (27.63%). However, (Abera and Husbandry, 2018) reported that the prevalence of Haemonchosis was higher in females (34.2%) than males (32.3%). This is consistent with (Abera and Husbandry, 2018; Brik et al., 2019; Diba et al., 2020; Fentahun and Luke, 2012; Raza et al., 2009; Tehrani et al., 2012), but it is disagreeing with the findings reported by (Gebresilassie and Afera Tadele, 2015; Zahida et al., 2010).

CONCLUSION

The result of the present research exhibited that the overall prevalence of Haemonchosis was 22.66%. In the study area, a high rate of *haemonchus* parasites is accountable for the loss of production in sheep. A higher prevalence of infection was in females than in males, and young animals were more highly affected than older animals. Therefore, the use of strategic deworming, improvement of husbandry practices, continuous surveillance of parasites, and investigation of the possible risk factors are suggested. However, it is recommended to provide proper care to young male and female sheep during feeding and grazing.

Acknowledgment: The authors are highly grateful to Senior Teaching Abduwajid Ismaielzai and all the members of the Para clinic Department, Veterinary Science faculty, Nangarhar University. The authors are very grateful to the slaughterhouse staff for their assistance during the period of sample collection.

Conflict of Interest: All authors express no conflict of interest in any part of the research.

Authors Contributions: All co-authors contributed substantially to this research article. R.A. and F.D. conceived the idea, designed the experimental methodology, and reviewed the manuscript; A.Z. implemented the experimental work analyzed the results, and wrote the manuscript; M.A. reviewed the manuscript and N.G. organized the raw material supplies.

REFERENCES

Abdo, B., Tesfaye, W., Agaro, A., Eshetu, B., & Mekuria, K. (2017). Prevalence and associated risk factors of small ruminant's haemonchosis in Debra-Zeit Elfora export Abattoir, Bishoftu town, Ethiopia. *Int J Adv Multidiscip Res*, *4*, 30-42.

Abera, A. (2018). Prevalence of ovine haemonchosis and associated risk factors in Jimma municipal abattoir. *International Journal of Veterinary Sciences and Animal Husbandry*, *3*, 27-31.

Acharya, S. N., Kastelic, J. P., Beauchemin, K. A., & Messenger, D. F. (2006). A review of research progress on cicer milkvetch (Astragalus cicer L.). *Canadian Journal of Plant Science*, *86*-(1), 49-62.

AL-Hasnawy, M. H. M. (2014). Prevalence and pathogenicity of Haemonchosis in sheep and goats in Hilla city/Iraq. *J. Babylon Univ./Pure and Appl. Sci*, *7*-(22), 12-20.

Bala, A. Y., Argungu, S. Y., & Ladan, M. U. (2015). Prevalence of haemonchosis and its relationship with faecal egg count, FAMACHA© score and haematological parameters in goats slaughtered at D/Shuni abattoir, Sokoto State. *J. Zool. Biosci. Res*, *2*-(1), 16-22.

Bitew, M., Amde, Y., & Belachew, K. (2011). Slaughtered in Different Restaurants in Hawassa. *Veterinary Research*, *4*-(2), 39-44.

Bowman, D. (2003). Parasitology for veterinary. In: Elsevier, New York, NY, USA.

Brik, K., Hassouni, T., Elkharrim, K., & Belghyti, D. (2019). A survey of Haemonchus contortus parasite of sheep from Gharb plain, Morocco. *Parasite epidemiology and control*, *4*, e00094.

Brik, K., Hassouni, T., Elkharrim, K., & Belghyti, D. (2019). A survey of Haemonchus contortus parasite of sheep from Gharb plain, Morocco. *Parasite epidemiology and control*, *4*, e00094.

Cernanska, D., Varady, M., & Corba, J. (2005). The occurrence of sheep gastrointestinal parasites in the Slovak Republic. *Helminthologia (Slovak Republic)*.

Diba, S., Birhanu, T., & Abera, Z. (2020). Prevalence of ovine heamonchosis in and around nekemte town, East wollega zone of Oromia regional state, western Ethiopia. *Global Veterinaria*, *22*-(3), 144-148.

Eke, S. S., Omalu, I. C. J., Ochaguba, J. E., Urama, A. C., Hassan, S. C., Otuu, C. A., & Okafor, I. D. (2019). Prevalence of gastrointestinal parasites of sheep and goats slaughtered in Minna Modern Abattoir, Niger State, Nigeria. *Journal of Animal Science and Veterinary Medicine*, *4*-(2), 65-70.

Fentahun, T., & Luke, G. (2012). Small ruminant haemonchosis: prevalence and associated determinants in randomly selected restaurants and hotels of Gondar Town, Ethiopia. *European Journal of Applied Sciences*, *4*-(4), 168-172.

Gebresilassie, L., & Afera Tadele, B. (2015). Prevalence of ovine haemonchosis in Wukro, Ethiopia. *Journal of parasitology research*, *2015*.

Habte, A., & Ibrahim, N. (2018). Prevalence of Haemonchus contortus infection in sheep slaughtered at Jimma town municipal abattoir, Ethiopia. *Tropical animal health and production*, *50*, 1865-1870.

Hasnain, H. U., & Usmani, R. H. (2006). Livestock of Pakistan", Livestock Foundation Islamabad.

Howell, S. B., Burke, J. M., Miller, J. E., Terrill, T. H., Valencia, E., Williams, M. J., ... & Kaplan, R. M. (2008). Prevalence of anthelmintic resistance on sheep and goat farms in the southeastern United States. *Journal of the American Veterinary Medical Association*, *233*-(12), 1913-1919.

Khalil-ur-Rehman, K. J., Tunio, M. T., & Kuthu, Z. H. (2009). Passive surveillance of gastrointestinal parasites in bufflaoes of Mandi Bahauddin and Gujrat districts of the Punjab. *The Journal of Animal & Plant Sciences*, *19*-(1), 17-19.

Lateef, M. U. H. A. M. M. A. D., Iqbal, Z. A. F. A. R., Jabbar, A. B. D. U. L., Khan, M. N., & Akhtar, M. S. (2005). Epidemiology of trichostrongylid nematode infections in sheep under traditional husbandry system in Pakistan. *International Journal of Agriculture and Biology*, *7*-(4), 596-600.

Magona, J. W., & Musisi, G. (2002). Influence of age, grazing system, season and agroclimatic zone on the prevalence and intensity of gastrointestinal strongylosis in Ugandan goats. *Small ruminant research*, *44*-(3), 187-192.

Mesele, H., & Zegeye, S. (2013). Prevalencia de haemonchosis en pequeños rumiantes alrrededor de Woreda Alameta. *REDVET. Revista Electrónica de Veterinaria*, *14*-(4), 1-14.

Mesele, K., Yisehak, T. R., & Nesibu, A. (2014). Prevalence of haemonchosis in sheep slaughtered at Abergele Export Abattoir. *Acta Parasitologica Globalis*, *5*-(2), 115-119.

Mubarak, A. M. (2013). *Prevalence and Risk Factors of Sheep Haemonchosis in North Kordofan, Sudan* (Doctoral dissertation, MSc Thesis. Sudan University of Science and Technology, Khartoum, Sudan).

Muradi, A. J., & Boz, I. (2018). The contribution of agriculture sector in the economy of Afghanistan. *International Journal of Scientific Research and Management*, *6*(10), 750-755.

Nahar, L., Sarder, M. J. U., Mondal, M. M. H., Faruque, M. O., & Islam, M. H. (2012). Factors related occurrence of haemonchosis of goats in Rajshahi, Bangladesh. *International Journal of Natural Sciences*, *2*-(3), 83-87.

Perry, B. D. (2002). *Investing in animal health research to alleviate poverty*. ILRI (aka ILCA and ILRAD).

Qamar, M. F., Maqbool, A., & Ahmad, N. (2011). Economic losses due to haemonchosis in sheep and goats. *Sci Intern*, *23*-(4), 321-324.

Qamar, M. F., Maqbool, A., Khan, M. S., Ahmad, N., & Muneer, M. A. (2009). Epidemiology of Haemonchosis in sheep and goats under different managemental conditions. *Veterinary World*, *2*-(11), 413-417.

Raza, M. A., Murtaza, S., Bachaya, H. A., Dastager, G., & Hussain, A. (2009). Point prevalence of haemonchosis in sheep and goats slaughtered at Multan abattoir. *J Anim Plant Sci*, *19*-(3), 158-159.

Tehrani, A., Javanbakht, J., Jani, M., Sasani, F., Solati, A., Rajabian, M., ... & Mohammadian, M. (2012). Histopathological study of Haemonchus contortus in Herrik sheep abomasum. *J Bacteriol Parasitol*, *3*-(5), 1000144-1000149.

Vanimisetti, H. B., Andrew, S. L., Zajac, A. M., & Notter, D. R. (2004). Inheritance of fecal egg count and packed cell volume and their relationship with production traits in sheep infected with Haemonchus contortus. *Journal of Animal Science*, *82*-(6), 1602-1611.

Vlassoff, A., Leathwick, D. M., & Heath, A. C. G. (2001). The epidemiology of nematode infections of sheep. *New Zealand Veterinary Journal*, *49*-(6), 213-221.

Waller, P. J., & Chandrawathani, P. (2005). Haemonchus contortus: parasite problem No. 1 from tropics-Polar Circle. Problems and prospects for control based on epidemiology. *Trop Biomed*, *22*-(2), 131-137.

Zahida, T., Sajjad, A., Lashari, M. H., & Hayat, C. S. (2010). Prevalence of Haemonchus contortus in sheep at Research Centre for Conservation of Sahiwal Cattle (RCCSC) Jehangirabad District Khanewal, Punjab, Pakistan. *Pakistan Journal of Zoology*, *42*-(6), 735-739.